



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,687	12/14/2005	Francesco Pessolano	NL 030671	1945

65913 7590 01/02/2008  
NXP, B.V.  
NXP INTELLECTUAL PROPERTY DEPARTMENT  
M/S41-SJ  
1109 MCKAY DRIVE  
SAN JOSE, CA 95131

EXAMINER
----------

HUYNH, PHUONG

ART UNIT	PAPER NUMBER
----------	--------------

2857

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

01/02/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

<b>'Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/560,687	PESSOLANO ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Phuong Huynh	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12/14/2005.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Objections*

1. Claim 12 is objected to because of the following informalities: at line 2, --one or more-- should be inserted before "the buffer stages". Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 6, 10-23, and 27-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Buer et al. (hereinafter "Buer") (USPN. 6,114,880).

Regarding claim 1, Buer discloses an integrated circuit comprising a timing closure monitoring circuit for monitoring timing closure in a logic path on the integrated circuit, the timing closure monitoring circuit comprising:

a signal generator [14] for generating a predetermined reference signal [see Buer: col. 2, lines 53-65; col. 3, lines 23-28]; a duplicate logic path [20] having characteristics matched with the logic path being monitored [see Buer: col. 3, lines 44-50], and connected to receive the reference signal from the signal generator [see Buer: col. 2, lines 53-65; col. 3, 17-27]; and monitoring means [28] arranged to receive an output signal from the duplicate logic path, and provide an output signal

indicative of the status of the timing closure in the logic path being monitored [see Buer: col. 4, lines 10-30].

Regarding claim 2, Buer discloses that the monitoring means is arranged to provide a timing closure violation signal when the output of the duplicate path is delayed by a predetermined amount [see Buer: col. 4, lines 18-30].

Regarding claim 3, Buer discloses that the integrated circuit includes a clock signal [CLK] for clocking the logic path being monitored, the clock signal [CLK] also being used by the signal generator to generate the reference signal [see Buer: col. 3, lines 8-27], and by the monitoring means [28] for monitoring the status of the output of the duplicate logic path [see Buer: col. 4, lines 31-57].

Regarding claim 4, Buer discloses that the reference signal produced by the signal generator is synchronized with the clock signal [see Buer: col. 3, lines 8-27].

Regarding claim 6, Buer discloses that the reference signal produced by the signal generator is delayed with respect to the clock signal [see Buer: col. 3, lines 45-57].

Regarding claim 14, Buer discloses that the timing closure violation signal [freq error] is supplied to a second timing closure monitoring circuit [30] on the integrated circuit, the first and second timing closure monitoring circuits generating a serial interrupt signal [see Buer: col. 4, lines 3-58].

Regarding claim 10, Buer discloses that the duplicate logic path is configured to match the delay and/or composition characteristics of the logic path being monitored [see Buer: col. 3, lines 44-51].

Regarding claim 11, Buer discloses that the duplicate logic path includes one or more buffer stages for matching the characteristics of the logic path being monitored [see Buer: col. 4 lines 9-17].

Regarding claim 12, Buer discloses that the buffer stages comprise the same number of switching gates as the logic path being monitored [see Buer: col. 4, lines 3-9].

Regarding claim 13, Buer discloses that the timing closure violation signal is used to generate an interrupt signal [see Buer: col. 4, lines 10-28].

Regarding claim 15, Buer discloses that the logic path being monitored is a critical path in the integrated circuit [see Buer: col. 2, lines 53-60].

Regarding claim 16, Buer discloses one or more further timing closure monitoring circuits, for monitoring timing closure in one or more further logic paths on the integrated circuit [see Buer: col. 2, lines 53-65; col. 3, lines 23-28; and col. 4, lines 10-30]. Although Buer does not explicitly disclose "one or more further monitoring circuits", Buer still discloses the claimed "one or more monitoring circuits" because these are duplicate part for multiple effects and this generally does not

provide patentable weight to the claimed invention. See *St. Regis Paper Co. v Bemis Co.* 193 USPQ 8 (7<sup>th</sup> Cir. 1977).

Regarding claim 17, Buer discloses that the monitoring means comprises a latch [see Buer: col. 3, lines 10-28; and lines 51-63].

Regarding claim 18, Buer discloses that the output signal of the monitoring means is used to control the timing closure in the logic path being monitored [see Buer: col. 4, lines 10-28; and lines 37-57].

Regarding claim 19, Buer discloses a method of monitoring timing closure in a logic path on an integrated circuit, the method comprising the steps of:

generating a predetermined reference signal [see Buer: col. 2, lines 53-65; col. 3, lines 23-28]; providing a duplicate logic path [20] corresponding to the logic path being monitored [see Buer: col. 2, lines 53-65]; passing the reference signal through the duplicate logic path [see Buer: col. 3, lines 17-37], and monitoring the output of the duplicate logic path, and using the output of the duplicate logic path to produce an output signal indicative of the status of the timing closure in the logic path being monitored [see Buer: col. 4, lines 10-30].

Regarding claim 20, Buer discloses that the output signal indicates timing closure violation when the output of the duplicate path is delayed by a predetermined amount [see Buer: col. 4, lines 18-30].

Regarding claim 21, Buer discloses that a clock signal [CLK] provided for clocking the logic path is used to generate the reference signal, and for monitoring the output of the duplicate path [see Buer: col. 3, lines 8-27].

Regarding claim 22, Buer discloses that the reference signal is synchronized with the clock signal [see Buer: col. 3, lines 8-27].

Regarding claim 23, Buer discloses that the reference signal is delayed with respect to the clock signal [see Buer: col. 3, lines 45-57].

Regarding claim 27, Buer discloses that the duplicate logic path is configured to match the delay and/or composition characteristics of the logic path being monitored [see Buer: col. 3, lines 44-51].

Regarding claim 28, Buer discloses that the logic path being monitored is a critical path in the integrated circuit [see Buer: col. 2, lines 53-60].

Regarding claim 29, Buer that the duplicate logic path is initially determined by: identifying a critical logic path in the integrated circuit [see Buer: col. 2, lines 53-65; col. 3, lines 23-28]; decomposing the critical path into one or more stages [see Buer: col. 2, line 65-col. 3, line 28]; constructing buffer stages [22, 22A, 22B] corresponding to the stages identified in the decomposing step [see Buer: col. 3, line 45-51; col. 3, line 64-col. 4, line 15], the buffer stages

being constructed to have the *same characteristics* as the stages of the critical path being monitored [see Buer: col. 4, lines 1-15]; and composing the duplicate path using the buffer stages constructed in the constructing step [see Buer: col. 4, lines 10-30].

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5, 8, 9, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buer et al. (hereinafter "Buer") (USPN. 6,114,880) in view of Chuang et al. (hereinafter "Chuang") (US Patent App. Pub. No. 2003/0128606).

Regarding claim 5, Buer does not disclose that the reference signal is synchronized with the leading edge of the clock signal.

Chuang teaches that the reference signal is synchronized with the leading edge of the clock signal [see Chuang: Paragraphs [0040] and [0046]].

It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the invention of Buer to include the signal, as taught by Chuang, to provide an unchanged select signal pulse width [see Chuang: Paragraphs [0040] and [0046]].

Regarding claim 8, Buer does not disclose that the signal generator is configured to generate a reference signal having a pulse width that is predetermined according to a design margin.



Chuang teaches that the signal generator is configured to generate a reference signal having a pulse width that is predetermined according to a design margin [see Chuang: Paragraphs [0032] and [0036]].

It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the invention of Buer to include the signal, as taught by Chuang, to improve overall performance, and enhance circuit robustness [see Chuang: Paragraphs [0032] and [0036]].

Regarding claim 9, Buer does not disclose that the design margin determines the sensitivity of the timing closure monitoring circuit for detecting timing closure violation.

Chuang teaches that the design margin determines the sensitivity of the timing closure monitoring circuit for detecting timing closure violation [see Chuang: Paragraphs [0032] and [0036]].

It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the invention of Buer to include the design margin, as taught by Chuang, to improve overall performance, and enhance circuit robustness [see Chuang: Paragraphs [0032] and [0036]].

Regarding claim 25, Buer does not disclose that the pulse width of the reference signal is chosen according to a predetermined design margin.

Chuang teaches that the pulse width of the reference signal is chosen according to a predetermined design margin [see Chuang: Paragraphs [0032] and [0036]].

It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the invention of Buer to include pulse width, as taught by Chuang, to improve overall performance, and enhance circuit robustness [see Chuang: Paragraphs [0032] and [0036]].

Regarding claim 26, Buer does not disclose that the design margin relates to the sensitivity of the timing closure monitoring circuit for detecting timing closure violation.

Chuang teaches the design margin relates to the sensitivity of the timing closure monitoring circuit for detecting timing closure violation [see Chuang: Paragraphs [0032] and [0036]].

It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the invention of Buer to include the design margin, as taught by Chuang, to improve overall performance, and enhance circuit robustness [see Chuang: Paragraphs [0032] and [0036]].

6. Claims 7 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buer et al. (hereinafter "Buer") (USPN. 6,114,880) in view of Flautner et al. (hereinafter "Flautner") (USPN. 7,278,080).

Regarding claims 7 and 24, Buer disclose wherein the reference signal is delayed with respect to the clock signal [see Buer: col. 3, lines 8-27], but not by an amount equal to  $(prop\_delay) - (1/2 \text{ design\_margin})$ , where  $(prop\_delay)$  is the propagation delay of a processing unit driving the logic path, and the design\_margin relates to the sensitivity of the circuit for detecting timing closure.

Flautner teaches the reference signal is delayed with respect to the clock signal by an amount equal to  $(prop\_delay) - (1/2 \text{ design\_margin})$ , where  $(prop\_delay)$  is the propagation delay of a processing unit driving the logic path, and the design\_margin relates to the sensitivity of the circuit for detecting timing closure [see Flautner: col. 1, line 57-col. 2, line 7].

It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the invention of Buer to include the delay, as taught by Flautner, to compensate additional

time and power consumption in recovering the system when a failure occurs [see Flautner: col. 1, line 57-col. 2, line 7].

### **Conclusion**

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong Huynh whose telephone number is 571-272-2718. The examiner can normally be reached on M-F: 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eliseo Ramos-Feliciano can be reached on 571-272-7925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Phuong Huynh  
Examiner  
Art Unit 2857

PH  
December 20, 2007

